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## Science studies

The subject of science studies is by its nature interdisciplinary with a foundation in biology, physics, earth sciences and chemistry. The subject covers health, energy and sustainable development, knowledge areas that have emerged in the intersection between science and social science.

### Aim of the subject

Teaching of science studies should aim at helping students develop their knowledge of science, and the ability to critically assess and develop their views on issues with a scientific content. It should lead to students developing an understanding of how scientific knowledge can be used in both professional life and everyday situations, and enabling students to make personal choices and form their views.

On the basis of current issues and events, teaching should give students the opportunity to use the knowledge and working methods of science. This means that while teaching should cover a variety of content, such as environmental and climate issues, the Earth's distribution of resources, recycling, health or genetic modification, it should also demonstrate how these issues can be managed using a scientific approach. By discussing and exploring issues with a social dimension, students should be given the opportunity to consolidate, deepen and develop their scientific knowledge to be able to meet, understand and influence their own contemporary conditions. Teaching should give students the opportunity to use digital technology and other tools to search for and acquire knowledge about science.

Teaching in the subject of science studies should give students the opportunities to develop the following:

- 1) The ability to use knowledge of science to discuss, form views and formulate different courses of action.
- 2) Knowledge of the role of science in current social issues and in relation to sustainable development.
- 3) Knowledge of the consequences of different lifestyles for both personal health, public health and the environment.
- 4) Knowledge of the structure and function of the human body, and its interaction with its surroundings.
- 5) Knowledge of how science is organised and how it can be critically examined and used for critical examination.
- 6) Knowledge of the significance of scientific theory for the development of societies and people's world view.

## Courses in the subject

- Science studies 1a1, 50 credits, which builds on knowledge from the compulsory school or equivalent. Grades in the course cannot be included in the student's diploma together with the grade in the course science studies 1b.
- Science studies 1a2, 50 credits, which builds on science studies 1a1. Grades in the course cannot be included in the student's diploma together with the grade in the course science studies 1b.
- Science studies 1b, 100 credits, which builds on knowledge from the compulsory school or equivalent. Grades in the course cannot be included in the student's diploma together with grades in the courses science studies 1a1 or science studies 1a2.
- Science studies 2, 100 credits, which builds on the course science studies 1a2 or science studies 1b.

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## Science studies 1a1

The course science studies 1a1 covers points 1–6 under the heading Aim of the subject.

### Core content

*Teaching in the course should cover the following core content:*

- Issues concerning sustainable development: energy, climate and impact on the ecosystem. Ecosystem services, utilisation of resources and the viability of ecosystems.
- Different aspects of sustainable development such as consumption, allocation of resources, human rights and gender equality.
- Scientific aspects, reflection on and discussion of norms concerning human sexuality, sexual desire, relationships and sexual health.
- Working methods of science, such as observation, classification, measurement and experimentation, and ethical perspectives related to scientific exploration.
- The scientific approach, how to put questions that can be investigated scientifically, and how to go about examining phenomena in the surrounding world.
- How science can be critically examined, and how a scientific approach can be used to critically examine statements lacking a scientific basis.

## KNOWLEDGE REQUIREMENTS

### Grade E

Students can **in basic terms** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put **simple** questions and to give **simple** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and give **simple** supporting arguments.

Students can give an account **in basic terms** based on relevant knowledge of sexuality and relationships, of how the human body is built up and functions in interaction with its surroundings. In connection with their account, students can **in basic terms** discuss the implications for both the individual's sexual health and for public health.

Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples students draw **simple** conclusions and propose some alternative courses of action, and give **simple** supporting arguments.

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Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in basic terms**. Furthermore, students can give simple examples of how theories can be tested through critical examination, and discuss **in basic terms some** examples of the ways in which a scientific theory has been important for the development of society.

## Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

## Grade C

Students can **in detail** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put **exploratory** questions and to give explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded** supporting arguments.

Students can give an account **in detail** on the basis of relevant knowledge of sexuality and relationships, of how the human body is built up and functions in interaction with its surroundings. In connection with the account, students can **in detail** discuss the implications both for the individual's sexual health, and for public health, **and support the discussion with well grounded arguments**.

Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples, students draw **well grounded** conclusions and propose some alternative courses of action, and give **well grounded** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in detail**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail** on the basis of **some** examples the ways in which scientific theories have been important for the development of society.

## Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

## Grade A

Students can **in detail and in a balanced way** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put **exploratory** questions and to give **complex** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded and balanced** supporting arguments.

Students can give an account **in detail and in a balanced way**, based on relevant knowledge of sexuality and relationships, of how the human body is built up and functions in interaction with its surroundings. In connection with their account,

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students can **in detail and in a balanced way** discuss implications both for the individual's sexual health and for public health, **and support the discussion with well grounded and balanced arguments**.

Students can give some detailed examples of how science can be linked to sustainable development. Based on examples, students draw **well grounded and balanced** conclusions and propose some alternative courses of action, and give **well grounded and balanced** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. Furthermore, students propose and carry out a simple scientific investigation and give an account of it **in detail and in a balanced way**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail and in a balanced way some** examples of the ways in which scientific theories have been important for the development of society.

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## Science studies 1a2

The course science studies 1a2 covers points 1–6 under the heading Aim of the subject.

### Core content

*Teaching in the course should cover the following core content:*

- The relationship between the individual's health, daily habits and lifestyles in society, covering issues such as training, diet, drugs and consumption, and impact on the environment. How science can be used as a point of departure for critically examining the content and norms of the media.
- Evolutionary aspects and ethical perspectives on the potential of biotechnology and its implications for human evolution and biodiversity. Cells and the smallest units of life as a basis for discussions on genetic engineering and other current research areas.
- Working methods of science, such as observation, classification, measurement and experimentation, and ethical perspectives related to scientific exploration.
- The scientific approach, how to put questions that can be investigated scientifically, and how to go about examining phenomena in the surrounding world.
- How science can be critically examined, and how a scientific approach can be used to critically examine statements lacking a scientific basis.

## KNOWLEDGE REQUIREMENTS

### Grade E

Students can **in basic terms** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put **simple** questions, and to give **simple** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and give **simple** supporting arguments.

Students can **in basic terms** give an account of how the human body is built up and works in interaction with the surroundings, and also how the body is affected by lifestyle. In connection with the account, students can **in basic terms** discuss the implications both for the individual's health, and for public health and the environment, and support the discussion with **simple** arguments.

Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples, students draw **simple** conclusions

and propose some alternative courses of action, and give **simple** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in basic terms**. Furthermore, students can give simple examples of how theories can be tested through critical examination, and discuss **in basic terms some** examples of the ways in which a scientific theory has been important for the development of society.

## Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

## Grade C

Students can **in detail** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put **exploratory** questions and to give explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded** supporting arguments.

Students can **in detail** give an account of how the human body is built up and works in interaction with the surroundings, and also the impact of lifestyle on the body. In connection with the account, students can **in detail** discuss the implications both for the individual's health, and for public health and the environment, and support the discussion with **well grounded** arguments.

Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples, students draw **well grounded** conclusions and propose some alternative courses of action, and give **well grounded** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in detail**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail** on the basis of **some** examples the ways in which scientific theories have been important for the development of society.

## Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

## Grade A

Students can **in detail and in a balanced way** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put **exploratory** questions and to give **complex** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded and balanced** supporting arguments.

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Students can **in detail** give an account of how the human body is built up and works in interaction with the surroundings, and also the impact of lifestyle on the body. In connection with the account, students can **in detail and in a balanced way** discuss the implications of different lifestyles both for the individual's health, and for public health and the environment, and support the discussion with **well grounded** arguments.

Students can give some detailed examples of how science can be linked to sustainable development. Based on examples, students draw **well grounded and balanced** conclusions and propose some alternative courses of action, and give **well grounded and balanced** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. Furthermore, students propose and carry out a simple scientific investigation and give an account of it **in detail and in a balanced way**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail and in a balanced way** some examples of the ways in which scientific theories have been important for the development of society.



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## Science studies 1b

The course science studies 1b covers points 1–6 under the heading Aim of the subject.

### Core content

*Teaching in the course should cover the following core content:*

- Issues concerning sustainable development: energy, climate and impact on the ecosystem. Ecosystem services, utilisation of resources and the viability of ecosystems.
- Different aspects of sustainable development such as consumption, allocation of resources, human rights and gender equality.
- The relationship between the individual's health, daily habits and lifestyles in society, covering issues such as training, diet, drugs, consumption, and impact on the environment. How science can be used as a point of departure for critically examining the content and norms of the media.
- Scientific aspects, reflection on and discussion of norms concerning human sexuality, sexual desire, relationships and sexual health.
- Evolutionary aspects and ethical perspectives on the potential of biotechnology and its implications for human evolution and biodiversity. Cells and the smallest units of life as a basis for discussions on genetic engineering and other current research areas.
- Working methods of science, such as observation, classification, measurement and experimentation, and ethical perspectives related to scientific exploration.
- The scientific approach, how to put questions that can be investigated scientifically, and how to go about examining phenomena in the surrounding world.
- How science can be critically examined, and how a scientific approach can be used to critically examine statements lacking a scientific basis.

## KNOWLEDGE REQUIREMENTS

### Grade E

Students can **in basic terms** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put **simple** questions, and to give **simple** explanations and arguments. In addition,

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students can give some examples of conceivable standpoints or alternative courses of action, and give **simple** supporting arguments.

Students can **in basic terms** give an account of how the human body is built up and works in interaction with the surroundings, and also how the body is affected by lifestyle. In connection with the account, students can **in basic terms** discuss the implications both for the individual's health, and for public health and the environment, and support the discussion with **simple** arguments.

Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples, students draw **simple** conclusions and propose some alternative courses of action, and give **simple** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in basic terms**. Furthermore, students can give simple examples of how theories can be tested through critical examination, and discuss **in basic terms some** examples of the ways in which a scientific theory has been important for the development of society.

## Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

## Grade C

Students can **in detail** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put **exploratory** questions and to give explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded** supporting arguments.

Students can **in detail** give an account of how the human body is built up and works in interaction with the surroundings, and also the impact of lifestyle on the body. In connection with their account, students can **in detail** discuss the implications of different lifestyles, both for the individual's health, and for public health and the environment, and support the discussion with **well grounded** arguments. Students can give some detailed examples of how science can be linked to sustainable development. On the basis of examples, students draw **well grounded** conclusions and propose some alternative courses of action, and give **well grounded** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. In addition, students propose and carry out a simple scientific investigation and describe it **in detail**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail** on the basis of **some** examples the ways in which scientific theories have been important for the development of society.

## Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

## Grade A

Students can **in detail and in a balanced way** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put **exploratory** questions and to give **complex** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded and balanced** supporting arguments.

Students can **in detail** give an account of how the human body is built up and works in interaction with the surroundings, and also how the body is affected by lifestyle. In connection with their account, students can **in detail and in a balanced way** discuss the implications of different lifestyles both for the individual's health, and for public health and the environment, and support the discussion with **well grounded and balanced** arguments.

Students can give some detailed examples of how science can be linked to sustainable development. Based on examples, students draw **well grounded and balanced** conclusions and propose some alternative courses of action, and give **well grounded and balanced** supporting arguments.

Students can in basic terms describe how science is organised and can be used for critical examination. Furthermore, students propose and carry out a simple scientific investigation and give an account of it **in detail and in a balanced way**. In addition, students can give simple examples of how theories can be tested through critical examination, and discuss **in detail and in a balanced way some** examples of the ways in which scientific theories have been important for the development of society.

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## Science studies 2

The course science studies 2 covers points 1–6 under the heading Aim of the subject.

### Core content

*Teaching in the course should cover the following core content:*

- Development of the universe as an explanation for the origin of matter and composition of the Earth.
- Structure of matter, properties of substances, interaction, ecocycling and indestructibility. Relationships and differences between energy and matter.
- Evolutionary mechanisms and development of organisms. How conditions for life and ecology can be studied at different levels.
- Human body organs and systems, their structure, function, evolutionary development and interaction with the environment.
- Organic and inorganic substances in everyday life and society. Industrial processes, technological development and environmental perspectives concerning the production of modern materials, food and other products.
- Working methods of science, such as observation, classification, measurement and experimentation, and ethical perspectives and aesthetic experiences related to scientific exploration.
- The scientific approach, how to put questions that can be tested scientifically, and how to go about examining phenomena in the surrounding world during testing.
- How science can be critically examined, and how a scientific approach can be used to critically examine statements lacking a scientific basis.
- The significance of science for the human culture and world views. Discoveries and advances in areas such as medicine, energy and materials development, from historical, contemporary and future perspectives.

## KNOWLEDGE REQUIREMENTS

### Grade E

Students can **in basic terms** discuss issues with scientific content of importance to the individual and society. In discussions students use scientific knowledge to put exploratory questions and to give **simple** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and give **simple** supporting arguments.

Students can **in basic terms** give an account of how the human body is built up and works in interaction with the surroundings, and also how the body is affected by lifestyle and the environment. In connection with the account, students can **in basic terms** discuss the implications of different lifestyles and the impact of the environment for both the individual's health and for public health, and support the discussion with **simple** arguments.

Students can give some detailed examples from a number of different areas of how science can be linked to sustainable development. On the basis of examples, students draw **simple** conclusions and propose some alternative courses of action, and give **simple** supporting arguments.

Students can **in basic terms** describe how science is organised and can be used for critical examination in a number of different areas. Furthermore, students carry out a simple scientific investigation and give an account of it **in basic terms** and evaluate it in a **simple** assessment. In addition, students can give **simple** examples of how theories can be tested through critical examination, and discuss **in basic terms** some examples of the ways in which scientific theories have been important for the development of society, and people's world view.

### Grade D

Grade D means that the knowledge requirements for grade E and most of C are satisfied.

### Grade C

Students can **in detail** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put exploratory questions and to give explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded** supporting arguments.

Students can **in detail** give an account of how the human body is built up and works in interaction with the surroundings, and also the impact of lifestyle and the environment on the body. In connection with the account, students can **in detail** discuss the implications of different lifestyles and the impact of the environment on both the individual's health and public health, and support the discussion with **well grounded** arguments.

Students can give some detailed examples from a number of different areas of how science can be linked to sustainable development. On the basis of examples, students draw **well grounded** conclusions and propose some alternative courses of action, and give **well grounded** supporting arguments.

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Students can **in detail** describe how science is organised and can be used for critical examination in a number of different areas. Furthermore, students carry out a simple scientific investigation and give an account of it **in detail** and evaluate it in a **balanced** assessment. In addition, students can give examples of how theories can be tested through critical examination, and discuss **in detail** on the basis of **some** examples the ways in which scientific theories have been important for the development of society, and people's world view.

## Grade B

Grade B means that the knowledge requirements for grade C and most of A are satisfied.

## Grade A

Students can **in detail and in a balanced way** discuss issues with scientific content of importance to the individual and society. In discussions, students use scientific knowledge to put exploratory questions and to give **complex** explanations and arguments. In addition, students can give some examples of conceivable standpoints or alternative courses of action, and provide **well grounded and balanced** supporting arguments.

Students can **in detail and in a balanced way** give an account of how the human body is built up and works in interaction with the surroundings, and also the impact of lifestyle and the environment on the body. In connection with the account, students can **in detail and in a balanced way** discuss the implications of different lifestyles and the impact of the environment on both the individual's health and public health, and support the discussion with **well grounded and balanced** arguments.

Students can give some detailed examples from a number of different areas of how science can be linked to sustainable development. Based on examples, students draw **well grounded and balanced** conclusions and propose some alternative courses of action, and give **well grounded and balanced** supporting arguments. Students can **in detail and in a balanced way** describe how science is organised and can be used for critical examination in a number of different areas. Furthermore, students carry out a simple scientific investigation and give an account of it **in detail and in a balanced way**, and evaluate it in a **balanced** assessment **and make proposals on how it can be improved**. In addition, students can give **complex** examples of how theories can be tested through critical examination, and discuss **in detail and in a balanced way some** examples of the ways in which scientific theories have been important for the development of society, and people's world view.